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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/667,559	09/22/2000	Noboru Matsuda	197226US-2TTC	9685

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EXAMINER

FARAHANI, DANA

ART UNIT PAPER NUMBER

2814

DATE MAILED: 05/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/667,559

Applicant(s)

MATSUDA ET AL.

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 September 2000.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4, 6, 7, 9, 11, 13-15, and 17-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Shimizu (U.S. 4,663,644).

Regarding claims 1 and 21, Shimizu discloses in figure 10 a semiconductor device comprising a first electrode gate group comprising gate electrodes 23 (between the other two gate electrode groups) having a plurality of gate electrodes formed on a semiconductor substrate to be away from each other at a first equal spacing; source contact 32 having a portion formed separated from a first gate electrode of the first electrode gate group by a second spacing greater than the first spacing; and source regions 27 for electrically interconnecting the first gate electrode group and the source contact.

Regarding claim 2, the source regions are connected to each other at one end of the first gate electrode group, and separated from each other at the other end of the first gate electrode group.

Regarding claim 3, the device in figure 10 comprises a first gate electrode group (middle electrodes) having a plurality of gate electrodes 23 formed on a semiconductor substrate to be away from each other at first equal spacings; a source contact portion

32 formed separated from the first gate electrode group to be away from the first gate electrode groups at a second spacing; and source regions 27 for electrically interconnecting the first gate electrode group and the source contact, wherein the source regions are connected to each other at one end of the first gate electrode group, and separated from each other at the other end of the first gate electrode group.

Regarding claim 4, the semiconductor device in figure 10 comprises a first gate electrode group between other two groups having a plurality of gate electrodes 23 formed on a semiconductor substrate to be away from each other at first equal spacings; a second gate electrode group at the right hand side of the first group having a plurality of gate electrodes 23 formed on the semiconductor substrate to be away from each other at the first equal spacings; a source contact portion 32 between the first and second gate electrode groups to be away from the first and second gate electrode groups at a second spacing; and source regions 27 for electrically interconnecting the first gate electrode group and the source contact, wherein the source regions are connected to each other at one end of the first gate electrode group, and separated from each other at the other end of the first gate electrode group.

Regarding claim 6, the gate electrode groups are formed in trench structures.

Regarding claim 7, each of the source regions is a diffused layer formed on the semiconductor substrate.

Regarding claim 9, there is a source electrode 33 on the semiconductor substrate, wherein the source contact portion is an electrode drawn from the source electrode.

Regarding claims 11 and 13, the semiconductor device in figure 10 comprises a first gate electrode group, between the other two groups, having a plurality of gate electrodes 23 formed on a semiconductor substrate to be away from each other at first equal spacing; a second gate electrode group to the right of the first group having a plurality of gate electrodes 23 on the semiconductor substrate to be away from each other at the first equal spacing; a third gate electrode group to the left of the first group having a plurality of gate electrodes 23 formed on the substrate to be away from each other at the first equal spacing; a first source contact portion 32 formed between the first and second gate electrode groups to be away from the first and second gate electrode groups at a second spacing; a second source contact portion 32 formed between the second and third gate electrode groups to be away from one selected from the second and third gate electrode groups at the second spacing; first source regions 27 which electrically interconnect the first gate electrode group and the first source contact portion; and second source regions which electrically interconnect the second gate electrode group and the second source contact, wherein the first source regions are connected to each other at one end of the first gate electrode group and are separated from each other at the other end of the first gate electrode group, and the second source regions are connected to each other at one end of the second gate electrode group and are separated from each other at the other end of the second gate electrode group.

Regarding claim 14, the first and second gate electrode groups are formed in trench structures.

Regarding claim 15, each of the first and second source regions is a diffused layer formed on the semiconductor substrate.

Regarding claim 17, each of the first and second source contact portions is an electrode drawn from a source electrode 33, and these portions are connected to each other.

Regarding claim 18, all the gate electrodes of the first and second gate electrode groups are used as gates for MOS transistors.

Regarding claim 19, the second source regions are connected to each other at one end of the second gate electrode group, and separated from each other at the other end of the second gate electrode group.

Regarding claim 20, the second spacing is greater than the first spacing.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 5, 8, 10, 12, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu.

Shimizu discloses the claimed invention except the gates in the group being connected to each other, and the gates of the groups being connected to each other, also. It would have been obvious to one of ordinary skill in the art at the time the

invention was made to connect all the gates to each other in order to make one MOS transistor.


### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani  
April 20, 2002

  
OLIK CHAUDHURI  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800